

Part II: Status of EMS Division Programs and Activities

Introduction

The Emergency Medical Services (EMS) Division of Public Health - Seattle & King County is dedicated to increasing survival and reducing disability from out-of-hospital emergencies in the county by providing the highest quality patient care in the pre-hospital setting. EMS Division programs are committed to supporting this effort and are developed and maintained through strong partnerships with other EMS agencies in the region and innovative leadership in the emergency medical field. This section summarizes the primary programs and activities involving the EMS Division.

A. King County Medic One Program

The EMS Division administers the King County Medic One (KCM1) paramedic program, one of six Advanced Life Support (ALS) programs operating in the county. KCM1 employs over 70 paramedics and support staff, and provides emergency medical response to patients in the south King County region. The KCM1 service area covers 544 square miles with a population of over 750,000 people (see *Appendix B: Regional Map of the ALS Provider Areas* on page 73).

Every day of the year, King County Medic One deploys seven full-time medic units. Each unit is placed strategically throughout the service area to minimize response times and maximize cost-efficiencies. KCM1 operates out of eight satellite sites that include local fire department stations, KCM1 facilities, and a central office in the industrial area of Kent. KCM1 has over 20 vehicles in their fleet and puts approximately 250,000 fleet miles on the vehicles each year.

Medic units are staffed with two paramedics working 24-hour shifts and utilizing five area hospitals for medical direction. In 2004, KCM1 responded to 12,140 dispatch-selected paramedic alarms in their primary service area in addition to responding to mutual aid requests in neighboring jurisdictions. This call volume has increased by more than 600 calls when compared the year 2003, and has resulted in a slight increase in the average paramedic unit response time in the region.



King County Medic One can be divided into four primary functional areas, including Administration, Operations, Paramedic Training, and Emergency Preparedness. The following provides a brief summary of each of these divisions:

Administration oversees important activities that ensure the smooth processing of contracts, purchasing of medical supplies and equipment, payroll oversight, and myriad other functions necessary to keep a full-time paramedic program operating 24-hours-a-day. The KCM1

administrative team includes both paramedic Medical Services Officers and support staff. It is configured to not only provide round-the-clock supervision and response back-up to the paramedic program, but to extend the reach to include partner agencies in south King County.

Representatives from KCM1 participate in regional planning and operations groups, including King County Fire Chiefs, Training Officers, trauma councils, hospital and emergency preparedness. The following KCM1 positions provide liaison representation and expertise in these specified areas: Program Administrator, 24-hour Shift Supervisor, Operations Supervisor, Training Supervisor, and Emergency Management Supervisor. Administrative also includes a Medical Program Director (MPD), a physician providing general medical oversight and direction for the paramedic program and advice on medical aspects of the service. Since KCM1 is a relatively large paramedic program, the MPD is assisted in this oversight by four Associate Medical Directors, one from each of the principal hospitals in south King County.

Operations at KCM1 has the responsibility of ensuring that vehicles, equipment, supplies, personnel and stations continue to function 24-hours-a-day, every day of the year. Highlights of operational accomplishments include the replacement of four vehicles with high mileage and the addition of a Technical Services vehicle for maintenance staff. A transition to Mobile Data Computers (MDC) in vehicles was initiated to enhance connectivity with the Valley Communications dispatch center and for automatic area mapping. KCM1 also purchased three additional LifePak-12 defibrillators in 2004 allowing reserve vehicles to be fully equipped and prepared for service during increased call volume periods or disasters.

In addition, updates were made to the KCM1 Emergency Operations Center at the Kent Headquarters, improving the KCM1's ability to manage large incidents and interface more directly with regional emergency management centers. A new centralized inventory management system was also implemented, enabling KCM1 to track the use of medical supplies and equipment destined for delivery to the regional paramedic stations. Other projects started in 2004 include the implementation of a fitness initiative with the establishment of a fitness leadership team, the review and update of the KCM1 Standard Operating Procedures, the process of transitioning to electronic medical record data collection, and a Medic One vehicle redesign for safety improvements.

Paramedic Training is responsible for the ongoing training and medical education of on-duty crews, in addition to the continual process of hiring and training new paramedics through the University of Washington Paramedic Training program. KCM1 Paramedic Training also oversees the quality improvement and review process for the KCM1 program in conjunction with the MPD. The following provides a summary of these activities:

Initial Paramedic Training: All King County Medic One paramedics are initially trained in the Paramedic Training Program at the University of Washington School of Medicine, based at Harborview Medical Center (HMC). Students develop their skills under the tutelage of experienced physicians, nurses, and Seattle Fire Department paramedics during the rigorous ten-month training course.

Continuing Education: As a condition of employment, all KCM1 paramedics are required to have a minimum of 100 hours of biannual continuing education in addition to skill levels testing that exceeds both Washington State and national standards. To meet this obligation, KCM1 provides quality training through a number of in-house, on-duty educational opportunities. In addition, various required classes are available to paramedics, including three-hour Harborview-based UW School of Medicine continuing education classes each month.

Paramedic training programs follow the path of logical and systematic progression from basic skills manipulation and knowledge testing to industry-leading programs developed specifically for King County paramedics. Training efficiencies are obtained by rotating crews into headquarters for several hours of training every other month. Ongoing medical education of paramedics are achieved through a variety of methods, including:

- Grand Rounds Training (GRT): GRT is an ongoing, bi-monthly training activity designed to train on-duty crews. The emphasis is primarily on manipulative skills, but operational updates, equipment changes, safety awareness and training are often included in GRT. Each session provides paramedics the opportunity to practice high risk, low frequency procedures and maintain critical medical skills.
- Medication of the Month (MOM): Paramedics are often called on to make critical decisions about medication treatment in a matter of seconds. Consequently, the paramedic must possess a ready knowledge of their medication options - recognizing the indication for treatment, appropriate dosing, therapeutic effects, and potential for side effects. To achieve this readiness, the Training Division provides ongoing education and review of medications carried by the paramedic as well as medications commonly prescribed by physicians. The review touches on all aspects of a specific medication so that the paramedic is prepared to provide the best care.
- 'Doctors' Meetings: At KCM1, each paramedic shift (A through D) has an assigned Associate Medical Director. At quarterly 'Doctors' meetings, each shift meets with their respective Associate Medical Director, the shift Medical Services Officer (MSO), and the Training/Quality Improvement MSO to review and discuss specific cases seen by the paramedics during the quarter. Paramedics receive feedback regarding the patient's admitting diagnosis, in-hospital care, and final disposition. Often the medical director will provide a brief lecture on a pertinent illness or disease process.
- Quality Assurance and Improvement: KCM1 and the EMS Division have been diligently working on streamlining the Total Quality Management (TQM) program. Review of standing processes has been very effective in validating the importance of asking questions relevant to patient care and outcome, measuring individual and system performance, and identifying and addressing operational and training issues the paramedics and physicians raise.

Emergency Preparedness is responsible for the Multiple Casualty Incident (MCI) Training provided to paramedics, in addition to the coordination of emergency preparedness and disaster

training with the regional fire departments and other paramedic providers. In 2004, some major achievements included:

- Annual MCI training for paramedics, paramedic students, and fire departments.
- Participation in South King County (Fire Zone 3) MCI drills.
- Participation in a Port of Seattle aircraft crash exercise.
- Expansion of the MCI dispatch run card to Seattle and Eastside Communication Centers.
- MCI Triage Training provided to Public Health – Seattle & King County clinics and jail health services.
- Participation in regional planning for the Avon Breast Cancer Walk-A-Thon.
- Participation in regional emergency medical and hospital preparedness efforts.

Dispatch Criteria Revisions: One of EMS' Strategic Initiatives during the current EMS levy period is to safely and appropriately manage the rate of growth in paramedic responses. KCM1 actively participates in monitoring the impact of periodic dispatch criteria changes and, in cooperation with Valley Communications Dispatch Center and local area fire departments, has been particularly successful in implementing the initiative (see page 23).

Special Services in the Community: Additional paramedic services are provided to the citizens of King County by staffing medic units for special events at the White River Amphitheater and the Pacific Raceways (although some events are reimbursed), and for major drills and exercises. A paramedic 'Bike Team' has been developed for events where motor vehicle access is limited. KCM1 personnel also participate in regional BLS training, dispatch quality review and training, regional medical supplies and equipment purchasing programs, regional hospital, trauma and emergency preparedness committees, and vehicle replacement initiatives.

The King County Medic One program also has a long history of being involved in many local and national clinical studies. KCM1 is currently involved in the Omega-3 fatty acid study, a study of the relationship between diet and cardiac arrest, and a study to define the incidence and outcomes from severe hypoglycemia (low blood sugar leading to coma). In addition, KCM1 is participating in a study investigating the use of 'hypertonic' intravenous solutions to determine whether concentrated saline improves outcomes from blunt trauma.

King County Medic One Donations: KCM1, like most paramedic providers, has a separate account for donations from citizens. These funds are used to supplement EMS levy funds and are specifically targeted to purchase equipment or support training of paramedics. Donations, typically donated in small amounts, are a strong expression of the community support for the services provided for KCM1. In 2004, these funds were used to purchase LifePak-12 defibrillators (please refer to *Appendix F: EMS Division Revenue/Expenditure Summary* for information on donation fund - page 81).

King County Medic One remains one of the premier paramedic providers in the nation. Its high cardiac-arrest survival rate and superior customer service and customer satisfaction levels help maintain its reputation and define its performance standard. The personnel who provide this core service are dedicated to public service at the highest level.

B. 2002 - 2007 Strategic Initiatives

IN PROGRESS

The Emergency Medical Services system in King County provides an outstanding public service to its citizens. The EMS Division coordinates development and implementation of the regional strategic plan in conjunction with EMS providers, partners in providing EMS services, and elected officials to help maintain this high quality public service.

The **2002 EMS Strategic Plan Update of the 1998-2003 EMS Strategic Plan** supports both currently implemented programs and the development of new projects in order to meet identified objectives characterized as 'strategic directions.' The EMS Strategic Directions consist of the following:

- Enhance existing programs and add new programs to meet emerging community needs to maintain or improve current standards of patient care.
- Manage the rate of growth in the demand for EMS services.
- Use existing resources more efficiently to improve operations of the system to help contain costs.

The **2003 Supplemental Plan** followed up on the strategic plan effort by identifying three major areas of focus for the implementation of the strategic directions. These included:

- Dispatch Enhancements
- Advanced Technology Projects
- EMS System Efficiencies

The term 'strategic initiative' was introduced in the **1998-2003 EMS Strategic Plan** and was used almost exclusively to describe twelve new and innovative approaches to improving the EMS system in King County, including the Review and Revision of the Criteria Based Dispatch (CBD) ALS Triage Criteria (see page 23), the Regional Purchasing Program (see page 41), the Alternate Destination and Patient Treatment (ADAPT) Program (see page 43). These twelve strategic initiatives were allocated specific funds to ensure their successful implementation and were completed in 2002.

The **2003 Supplemental Plan** continued in this manner by supporting continuation of the strategic initiatives already in progress and identifying new programs and initiatives that were thought to significantly contribute to the successful achievement of the Strategic Directions. The current set of strategic initiatives was again allocated dedicated funds to ensure adequate financial support.

In June 2004, the EMS Advisory Committee approved an amendment to the strategic plan and increased Strategic Initiative funds to support enhancements to the Web-based Training for EMS Personnel, Paramedic and EMT Procedure and Patient Treatment Evaluations, Enhanced Care for Specific EMS Patients projects and EMS Levy Planning for 2007, and fund the newly developed Regional EMS Tracking Resource - Online (RETRO) Project.

The table below summarizes the status of each strategic initiative and is followed by brief project descriptions (a Summary Financial Report is located on page 63).

2002-2007 Strategic Initiative Summary Table

Strategic Initiative	Current Status
I. Dispatch Enhancements:	
Review and Revision of the Criteria Based Dispatch (CBD) ALS Triage Criteria	Ongoing
EMD Quality Improvement	Ongoing
Enhanced CBD Basic Training and Continuing Education Curricula	Ongoing
II. Advanced Technology Projects:	
Web-based Training for EMS Personnel and Dispatchers	Ongoing
Regional Electronic Data Collection Project	Completed: 12/03
Regional EMS Tracking Resource - Online (RETRO) Project	Ongoing
III. EMS System Efficiencies:	
Financial Review of EMS Sub-Funds	Ongoing
Paramedic and EMT Procedure and Patient Treatment Evaluations	Ongoing
Injury Prevention Programs	Ongoing
Enhanced Care for Specific EMS Patients	Ongoing
Assessment of the Impact of State Budget Cuts on the EMS System	Completed: 01/05
IV. Strategic Plan	Initiated: 07/05

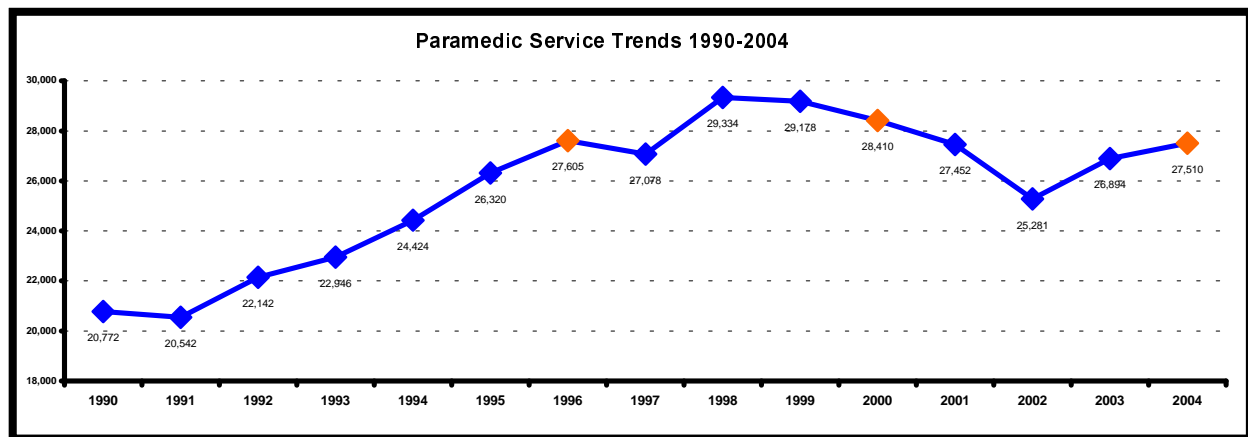
I. Dispatch Enhancements

As indicated in the *2002 EMS Strategic Plan Update*, 9-1-1 communication centers are the access point to emergency medical services and thus 'play a critical role in managing the use of high cost advanced life support (ALS) resources.' During the first three years of the 2002-2007 EMS Strategic Plan, initiatives that invested in data-driven revisions to the dispatch guidelines, training and education of dispatchers, and enhanced quality improvement practices, demonstrated improved effectiveness and efficiency of ALS dispatch. The following section describes the current status of the three major dispatch-related Strategic Initiatives.

Continued Review and Revision of the Criteria Based Dispatch (CBD) ALS Triage

Criteria: One of the Strategic Directions identified in the *1998-2003 EMS Strategic Plan* and supported in the *2002 EMS Strategic Plan Update* was to determine ways to decrease the rate of growth of ALS calls. A major component of this effort was to revise the Criteria Based Dispatch (CBD) Guidelines that helped determine the level of ALS care required by patients.

In 2000, the EMS Division completed a major revision of the CBD Guidelines. An analysis of King County paramedic service trends demonstrated an encouraging reduction in total ALS call volumes from 1998 to 2002, particularly when compared to a call volume high of 29,334 in 1998 (see graph below). Further analysis of the revisions demonstrated marked geographic variation in the percentage of ALS dispatches to overall BLS dispatches (23% to 41%). Some reduction in this disparity has occurred since 2001 (variation is now 23% to 37%). The EMS Division will continue to review local area dispatching practices to learn how to improve emergency medical responses in our region.

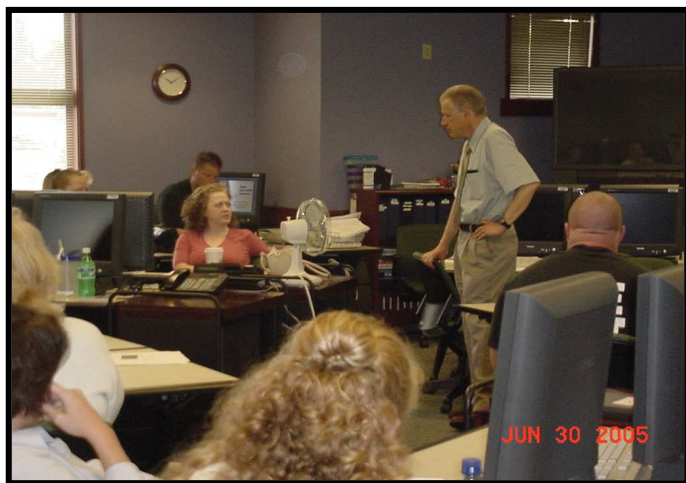


The orange diamond ♦ reflects a year in which CBD revisions were implemented.

The EMS Division again completed a comprehensive revision to the CBD Guidelines in May 2004. Training in the revised guidelines was provided to dispatchers and fire department personnel in June 2004 and the new guidelines were put into effect on July 1, 2004. A comparative analysis will be conducted in late 2005 to measure the impact of the 2004 CBD

Guidelines revisions. Data from July 1, 2004 through June 30, 2005 will be required in order to conduct this analysis, although significant reductions as seen in the years following the 2000 CBD revisions are not anticipated since changes to the 2004 CBD guidelines were minor compared to the 2000 revision and overall call volumes are increasing in the region.

Emergency Medical Dispatch (EMD) Quality Improvement: The development of an EMD Quality Review Program is an integral part of the *2002 EMS Strategic Plan Update*. In 2001, the EMS Division in cooperation with King County Dispatch centers began a formal process for



Medical Program Director, Mickey Eisenberg, MD answers student questions in an Emergency Medical Dispatch class

review of dispatch tapes and associated EMS reports for the purpose of EMD quality improvement. The process includes 1) the identification of cases meeting certain review criteria, 2) the retrieval of dispatch tapes and reports from dispatch centers, and 3) a review of these cases by a team consisting of a paramedic and a dispatcher.

As of June 2005, approximately 3,400 cases have been reviewed. If appropriate, feedback from this case review is provided to the individual dispatcher and is also used in continuing education when systemwide trends for

improvement are identified. The Quality Review teams have found that using this focused training has had a positive impact on the dispatchers by improving their decision-making abilities.

Enhanced CBD Basic Training and Continuing Education Curricula: A priority for enhanced dispatch training included revisions to both Basic and Continuing Education training in Criteria Based Dispatch. Three major changes to this training occurred between July 2002 and June 2005.

1) *Addition of Pre-course Anatomy and Physiology Class:* Dispatch improvements continue to focus on expanding and creating enhanced training for Emergency Medical Dispatch (EMD). A pre-requisite course of Anatomy and Physiology is currently being delivered and is a requirement prior to attending the Basic Criteria Based Dispatch course. This 8-hour course provides the dispatcher with a basic understanding of human anatomy and physiology. This method of delivery allows for more scenario-based discussions in the basic CBD course during which time the students can focus on the application of their knowledge of the body systems as they relate to Criteria Based Dispatch response codes and pre-arrival instructions.

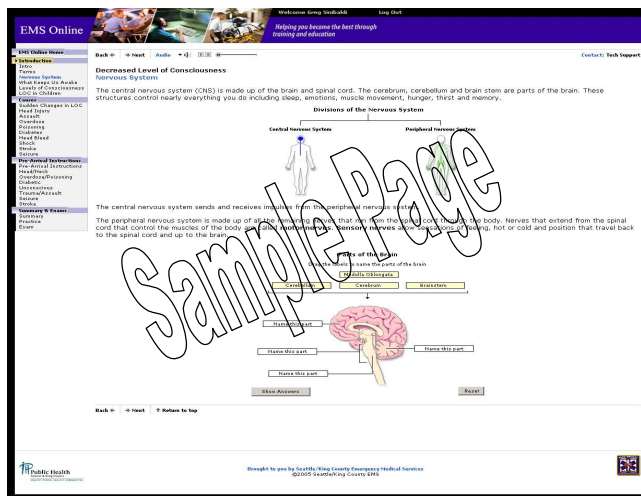
Students also receive 'Anatomy and Physiology' educational materials to assist them in the learning process in the basic course as well as the continuing education they attend in their careers as Emergency Medical Dispatchers in King County. The Basic CBD course continues to

provide the students with a review of anatomy, physiology, and pathophysiology. The objective is to provide the EMDs with this knowledge and enhance their good decision-making skills with the additional medical training.

2) *Problem/Scenario-Based Method of Delivery*: One of the main projects for 2005 is to update and revise the method of training delivery to include more student-centered learning activities such as problem-based scenarios, role-playing, and other methods that involve students in the learning process. The curriculum consists of carefully selected and designed problems that demand from the learner an acquisition of critical knowledge, problem solving proficiency, self-directed learning strategies, and team participation skills. Studies have shown that the participants in a course with this style of delivery are able to apply their knowledge and seek out information more effectively than those students receiving a lecture-based method.

3) *Online Web-based Training for Dispatchers*: In December 2003, the first module of web-based continuing education was delivered. The subject was 'Telephone CPR/Cardiac Arrest'. This module included a variety of student activities as well as audio scenarios that supported the objectives of the course. In 2005, a second course, 'Decreased Level of Consciousness,' was provided online.

Both of these courses were well-received by dispatchers and there have been requests for more opportunities to participate in this type of training. Agencies outside of King County have also requested approval to participate in this training and a User Agreement for interested agencies has been developed. The subject for Fall 2005 will be 'Pediatric Emergencies'.



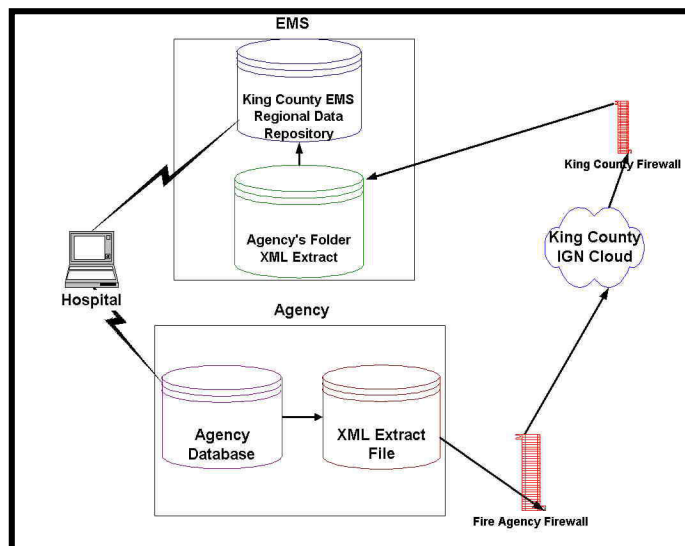
The web-based curriculum is designed to allow the participant an opportunity to use internet links and other additional tools to enhance their knowledge base. The web-based format is supplemented with in-classroom training which allows the students to ask questions of the instructor and apply the knowledge from their web-based training to specific scenarios and guided group discussions.

Development of strategic initiatives that target enhancements to the EMS dispatch system relate directly to all three strategic directions identified in the 2002 EMS Strategic Plan Update. A multifaceted approach to improving the dispatching of EMS personnel has reduced the demand for paramedic response, used innovative teaching techniques to improve patient care, and used resources in an efficient and thoughtful manner.

II. Advanced Technology Projects

The development of projects that incorporate advancements in technology offers a variety of opportunities for improved efficiencies in the EMS system. This includes electronic data collection, on-line training of personnel, and electronic record-keeping. Current technologies allow for rapid and direct communication between EMS agencies, accurate and secure transmission of information, and simplified management and oversight of EMS activities. The following section describes the three major technology-related Strategic Initiatives.

Regional Electronic Data Collection Project: One of the Strategic Initiatives identified in the *1998-2003 EMS Strategic Plan* and supported in the *2002 EMS Strategic Plan Update* was the development of an enhanced EMS monitoring system that would allow for improved oversight of the EMS system. The **Regional Data Collection (RDC) Project** was a five-year countywide effort to implement a system that allowed for electronic collection and distribution of EMS data.



The goal of the project was to enable all EMS providers in King County to complete an electronic version of the Medical Incident Report Form (MIRF) and electronically transfer directly to a central EMS database. The collection and consolidation of data via electronic means improved the accuracy and completeness of the data, provided access to the aggregate data by individual service providers, allowed for more intensive analysis of the data, and facilitated the assembly of system reports.

The RDC Project was completed as a pilot project in December 2003 and integrated into the regular programs and activities within the EMS Division. The RDC Project was able to accomplish a number of critical functions, including establishment of a defined standardized EMS data set, redesign of the data management system, establishment of a central data server with network connectivity to participating agencies, and development of a pathway for the electronic transfer of data. This was accomplished using 66% of the allocated budget.

There are currently eighteen EMS agencies collecting data electronically across King County, including Auburn Fire Department, Bellevue Fire Department, Eastside Fire & Rescue, Federal Way Fire Department, Fire District #40, Fire District #44, Kent Fire & Life Safety, Kirkland Fire Department, Maple Valley Fire & Life Safety, Mercer Island Fire Department, North Highline Fire District (#11), Port of Seattle Fire Department, Redmond Fire Department, SeaTac Fire Department, Seattle Fire Department, Shoreline Fire Department, Woodinville Fire and Life Safety, and Vashon Island Fire & Rescue. These departments represent 79% of the forms generated each year. Five additional agencies are expected to begin electronic data collection

during 2005, increasing electronic reporting by EMS agencies to 87%. King County Medic One has also started the process of moving to electronic data collection, and should have a system in place by early 2006, bringing the total number of records reported electronically to over 95%.

Another objective of the Regional Data Collection Project is to establish connectivity with local area hospitals. A pilot project involving a local hospital and several EMS agencies is currently testing the best options for implementation. The immediate benefit of such a network is to allow current quality improvement activities to include patient outcome information. This is a critical element of patient care review and could affect EMS patient care protocols, policies, and procedures. A long-term benefit is the ability for EMS personnel to provide hospitals with a medical incident report in advance of patient arrival at the facility. This is exceptionally useful to hospitals in instances where patients require mobilization of medical resources such as a catheterization lab or specialized surgical team.

In all cases of data collection and transfer, the strictest policy of patient confidentiality is maintained. This includes utilization of secured methods for data transfer and limited access to confidential information. In accordance with the Washington State Uniform Health Care Information Act (RCW 70.02) and Health Insurance Portability and Accountability Act (HIPAA) regulations, the EMS Division is evaluating additional areas for improvement.

As a sub-set of the Regional Data Collection Project, the **Alternate Input Device (AID) Project** is designed specifically to evaluate the use of a custom electronic incident report data collection system for use by EMS personnel in the field. Due to limitations in current technological capabilities, EMS agencies that have electronic systems are still obligated to use a paper form in the field where vital patient information is captured and forwarded with patients transported to hospitals.

The AID Project was initiated in 2001 with the goal of creating a truly electronic incident report data collection system within King County. The AID electronic form is designed to run on any certified Microsoft Windows XP-based tablet device. The software was modeled after the current King County paper medical incident report form (MIRF).

Since 2001, the AID Project has completed two separate development phases. During this time, the form has seen a number of revisions and improvements based on core team recommendations and EMS agency feedback. Currently, the AID Project is in Phase III development with a target field testing start date of Fall 2005. Phase III objectives include integrating dispatch center data, evaluating the importation of AID data into local agency record management systems, improving form design and layout, and improving print views.

Four EMS agencies are currently participating in Phase III, including Bellevue Fire Department, Federal Way Fire Department, Kent Fire Department, and Shoreline Fire Department. Each agency will receive a tablet with the revised AID form installed and printers mounted in responding vehicles. EMS agencies will test the utility of the revised form, printing capabilities, and integration issues. The pilot is expected to run for approximately three months.

This regional project is very complex, and as with all larger technology projects has been divided into manageable specified phases. This strategy has avoided the expenditure of significant funds in an environment of rapid advancement in tablet and systems technology. The AID Project is designed to move forward in a specifically defined direction while waiting for technology advances to support the desired infrastructure. This includes a network of connectivity to hospitals, ambulance companies using wireless technology and/or integrated web-based services.

Web-based Training for Dispatchers and EMS Personnel: Development of training programs that utilize current web-based technologies allows for expedient and cost-efficient delivery of training services for dispatch and EMS personnel. The web-based training Strategic Initiative (EMS Online) targets the development of new basic and continuing education modules for dispatchers and ongoing development of continuing education modules for EMTs.

This method of delivery allows project participants an opportunity to log onto the Web and access training modules during non-peak service hours and receive training in intervals that best meets the needs of the participant. Lessons are interactive with a focus on application of the objectives, and include a participant feedback mechanism built into the lesson plan allowing students immediate response on both test questions and scenario responses.

A proposal requesting additional Strategic Initiative funds for the development of the next phase of the web-based EMS personnel training project was reviewed and approved by the EMS Advisory Committee in June 2004. Enhancements included the addition of streaming audio/video options, additional interactive content, and improved access to training records by local agency administrators. For more details on the web-based training for dispatchers, please refer to page 25, and for EMTs, please refer to page 38.

Regional EMS Tracking Resource - Online (RETRO) Project: The RETRO Project, an approved Strategic Initiative to build a centralized database to track and store information related to EMS personnel across King County, is approaching the end of its feasibility analysis phase. The findings indicate that steps should be taken to implement an Electronic Records Management (ERM) system to replace the existing paper-based program. The ERM system has multiple benefits over paper-based records, including enhanced search capabilities and data extraction methods. Types of EMS personnel records include: dates and requirements related to certification and recertification, reciprocity requirements, practical skill set requirements for certification, and teaching certification requirements.

The proposed ERM system consists of a scanning solution and an electronic records database. The multi-systems database will collect and track information for each EMS individual entering into the EMS system in King County and eliminate the intensive, time-consuming use of paper

files. The records database will host information that links to the scanned images, thus ensuring that the EMS Division is better able to track the State and King County certification and recertification requirements critical to maintaining or improving current standards of patient care.

Development of strategic initiatives that incorporate advancements in technology into the fundamental design of EMS system programs support strategic directions identified in the 2002 EMS Strategic Plan Update. Using the current standard practice of implementing electronic systems to improve data quality and efficiency, provide flexibility in training of EMS personnel, streamline record management, and reduce record retrieval demand meets both the Strategic Direction objectives of identifying innovative technologies to improve patient care and using resources in an efficient and cost-conscious manner.

III. EMS System Efficiencies

The Emergency Medical Services (EMS) system provides an internationally regarded regional service to the citizens of King County. However, improvements and innovations regarding the management and financing of the four levy-supported ALS, BLS, Regional Services and Strategic Initiative sub-funds, review of EMS standards of practice, continuation of injury and illness prevention programs, and analysis of particular EMS sub-populations that could benefit from enhanced care are integral to the provision and maintenance of any high quality EMS system.

The following section describes the four major efficiency-related Strategic Initiatives:

Financial Review of EMS Sub-Funds: The EMS levy in King County provides full support for Advanced Life Support (ALS) services, Regional Services, and Strategic Initiatives, and contributes to Basic Life Support (BLS) services. As part of the *2002 EMS Strategic Plan Update* process, a committee of elected officials, representatives of cities and unincorporated areas reviewed each of these sub-funds extensively. This review process was useful in educating decision-makers on how funds are being spent, identifying areas for improvement, assisting in the prioritization of projects, and providing flexibility in responding to program needs. The process ultimately strengthens the regional system's ability to allocate funds, target areas of greatest need, and support areas that produce efficiencies or increase the system's effectiveness.

ALS Sub-Fund: As recommended in the *2002 EMS Strategic Plan Update*, ALS funding is evaluated annually to minimize cost shifting to ALS providers. Each year, a subset of the EMS Advisory Committee meets to review current and projected ALS costs and compares these to the current ALS allocation. Significant cost drivers leading to this recommendation included rising labor costs, and increased costs of pharmaceuticals and medical supplies.

Based on individual agencies experience, an increase above Consumer Price Index (CPI) was recommended and implemented in 2003 (5.5% above CPI for a total increase of 8%). Due to the

size of this increase an additional increase was not recommended in 2004. Increases of 2.1% above CPI are currently budgeted for 2005 and 2006. Please see page 60 for more details.

BLS Sub-Fund: The mechanism for allocating the BLS fund to individual EMS agencies uses a complex formula reflecting agency contributions in assessed valuations, the percent of unincorporated area in the jurisdiction, and the number of EMS agency responses. The formula also incorporates a principle that no agency will receive less funding than the previous year, a concept known as being 'held harmless.' The BLS funding formula was revised in 2002 to address a soaring hold harmless amount and provide a more appropriate method for defining formula elements. A key element of the revision process was a commitment on the part of the EMS Division to evaluate the formula on an annual basis to ensure it was operating as expected.

Changes made to the formula in 2002 have been successful in reducing the amount of hold harmless by over 51%. EMS agencies convened in July 2005 to review the 2006 BLS allocations and evaluate the status of the hold harmless amount. Minor adjustments were again recommended for the 2006 BLS funding formula to maximize reduction of the hold harmless amount and ensure protection for small, rural agencies. It is expected that the BLS Funding Formula will be reviewed in depth during the upcoming levy planning period.

Regional Services Fund: The EMS Division reviews the current Regional Services Program budget annually. Like other city and county departments, Regional Services faces challenges with expenses increasing at rates higher than CPI (particularly related to salaries, benefits, and indirect and overhead costs). Regional Services has been able to accommodate costs increasing at a rate higher than CPI by using savings from previous years (such as salary savings from positions that are temporarily vacant).

Strategic Initiative Fund: Although the *2003 Supplemental Plan* provided adequate detail for the development and implementation of the current EMS Strategic Initiatives, project plans evolved to better reflect intended project objectives. In 2004, the EMS Advisory Committee approved additional funding to accommodate these changes.

Paramedic and EMT Procedure and Patient Treatment Evaluations: Provision of the highest level of patient care is the primary objective of the EMS program in King County. Ongoing review of paramedic and EMT procedures and patient treatment plans is essential to maintaining a quality EMS system. Due to increased strategic initiative funding in 2004, a new research assistant was hired to assist in patient treatment evaluations. The following items characterize the variety of evaluations that are underway or soon to be underway in the county:

- **Pediatric Seizures:** Since it is often difficult to establish intravenous access in an infant or toddler, review of emergency medications is an important question. In these cases, evaluation will establish whether rectal Valium (Diatat) is a useful addition to the list of paramedic drug options. For pediatric seizures, rectal valium can be life-saving. Data will be abstracted from every seizure call for a period of 6 months to determine whether Diastat would have been needed to treat the patient. This will offer a realistic picture of the need for rectal valium and to suggest possible training needs.

- Glucometry: This minimally invasive procedure provides rapid measurement of blood glucose levels and can be helpful in the assessment of patients with an altered level of consciousness. EMT glucometry is now an approved procedure in King County. Patients treated for hypoglycemia (low blood sugar) will be evaluated to see if they can safely be left at home following appropriate response to therapy. Evaluations will be conducted via telephone interviews with patients.
- Glucagon for Low Blood Sugar: Low blood sugar (hypoglycemia) can lead to seizures or brain damage and patients with this problem need to have this situation corrected as rapidly as possible. An evaluation of the number of hypoglycemia episodes in which the patient cannot swallow oral sugar will help determine whether it is appropriate to consider Glucagon (an auto-injector to treat low blood sugar) as an appropriate skill for EMTs. During a 12-month period, data will be collected where intravenous glucose was administered by paramedics for patients with low blood sugar. The evaluation will also measure the time interval between EMT and paramedic arrival.
- Naloxone for Narcotic Overdoses: Naloxone (Narcan) is a very effective drug to reverse the effects of narcotic overdose. Patients who take too much of a narcotic, either intentionally or accidentally can stop breathing. An evaluation of the number of episodes of narcotic overdoses in which paramedics must administer Naloxone (Narcan) to reverse the effects of the narcotic will be conducted, in addition to the time interval between EMT and paramedic arrival. Narcan can be given intravenously (the route paramedics administer the drug) as well as subcutaneously and intra-nasally. The analysis will also determine whether it is appropriate to train EMTs to administer Naloxone.
- Emesis in Cardiac Arrest: Some evidence exists that excessive ventilation during cardiac arrest may lead to emesis. In order to see if this is a problem in the EMS system in King County, measurements of cardiac arrest-associated emesis is being conducted. Depending on the results, corrective steps may be made in the training of bag-valve mask ventilation. Two years of data will be studied to determine the incidence of emesis and when it occurs during the resuscitation. This has direct implications for EMT training as well as dispatcher training.
- Neonatal resuscitations: Cardiac and respiratory arrest in neonates is very challenging in the EMS setting and the ability to administer intravenous medication is crucial. All neonatal resuscitations during the past 5 years will be evaluated to determine if umbilical catheterization is an option for the administration of fluids or medications.

Injury Prevention Programs: Each year more than 90,000 people die in the United States as a result of unintentional injuries. The estimated annual cost of injury is over \$224 billion for direct medical care, rehabilitation, lost wages and productivity losses. During an average year in the U.S., unintentional injuries account for nearly 31 million emergency room visits (Burt CW, Fingerhut LA 1988). In 2004, approximately 13% of BLS responses in King County (excluding Seattle) were for unintentional injuries involving accidents, bicycles, burns, electric shock, motorcycles, machinery, motor vehicles, pedestrian versus motor vehicles, skateboards, and

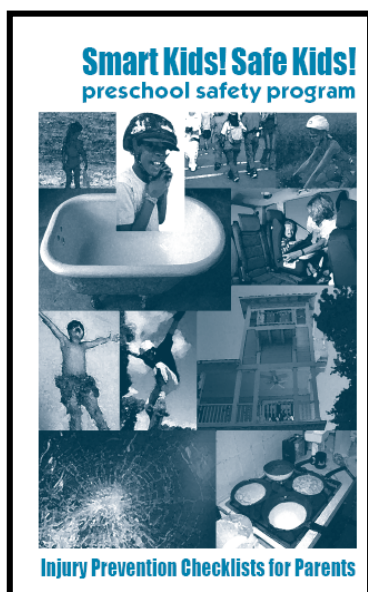
sports injury. Over 60% of the patients were transported to local hospitals. The EMS Division has identified three populations at high risk for injury: older adults, preschool-aged children, and teens.

Among older adults, falls are the leading cause of injury deaths (Murphy, 2000), and the most common cause of non-fatal injuries and hospital admissions for trauma (Alexander, 1992). More than one third of adults over 65-years-old fall each year. Unintentional falls account for 87% of all fractures treated in emergency departments and are the second leading cause of spinal cord and brain injuries. For example, George Burns died in 1998 at age 100 after falling in his bathtub and William Holden died from head trauma from a fall at home.



Furthermore, more children in the U.S. aged 4 - 8 years old die in motor vehicle related crashes than from any other kinds of unintentional injury. Over 85% of children who ride in a child restraint are improperly secured. Almost 40% of children riding with unbelted drivers were themselves unrestrained. Local and national statistics indicate that motor vehicle crashes are the leading cause of injury and/or death for adolescents. All too often these preventable crashes involve reckless driving, lack of seatbelt use, and the use of alcohol and/or drugs.

Injuries are preventable! The following programs are designed to address specific high-risk populations to help reduce injuries: **Smart Kids! Safe Kids!** - a pre-school fire and injury prevention program; **Think Again** - an in-classroom education program for high school students that discusses the consequences of drinking and driving; **Child Passenger Safety at Public Health Centers** - a self-sustaining child car seat program at various Public Health Centers for Maternity Support Service (MSS) clients; **Randomized Fall Pilot Study** - a research project to prevent falls in older adults; and **Fire Department Kids Day at Boeing Flight Museum** - a day for the community to learn about fire and life safety from local fire departments.



With the successful implementation of the **Smart Kids! Safe Kids!** curriculum, another component was recently added. The 'parent handbook' is an injury prevention handbook designed to assist parents in educating their children on the dangers of some specific high-risk activities in and around the home and was presented to teachers and parents at evening meetings. Two preschools in King County Fire District #40 participated in the presentations with a total of 22 parents and 21 teachers in attendance. Federal Way Fire Department presented to three preschools with 23 parents attending. In Seattle, four teacher presentations were held along with two parent nights for a total of 28 teachers and 27 parents in

attendance. In addition, a quarterly Smart Kids! Safe Kids! injury prevention newsletter has been produced for the preschools.

The **Think Again Program** is administered by the EMS Division and the King County Fire & Life Safety Association (KCFLSA) and funded by the Washington State Traffic Safety Commission (WTSC). The KCFLSA has set goals to reach our most



vulnerable young adolescents using the Think Again classroom presentation targeting 15-19 year olds.

Four fire departments in King County submitted requests from WTSC to help fund programs – Eastside Fire & Rescue, Kent Fire

Department, Kirkland Fire Department, and King County Fire District #40. Participating fire departments received a total of \$8,067 in grants from the Washington Traffic Safety Commission (WTSC) to support the Think Again program. Additional participating fire departments include Auburn, Bothell, Federal Way, Northshore, Redmond, Shoreline, and Woodinville. From October 2004 through June 2005, 1,549 students have participated in the Think Again program. Since its inception in 1998, over 36,500 students have been through the program.

The **Child Passenger Safety (CPS) Program** for Public Health Centers recently implemented a pilot project to educate Maternity Support Services (MSS) clients at the Federal Way, White Center, and Eastgate Public Health Centers. This project allows for billable visits by an NHTSA Certified Passenger Safety Technician, hence making this program self-sustaining in that it pays for a portion of the technician's time and/or the purchase of additional car seats.

This project is by "appointment" and every 30 minutes two MSS clients are educated on the proper methods of installing a car seat. Whenever possible, car seats are provided to needy families. These classes are offered in English, Spanish, Vietnamese and Ukrainian.



Fire Department Kids Day at Boeing Flight Museum was one of the most successful events ever! Over 500 people came to see the firefighters and their rigs and learn all about injury and fire safety. KMPS radio station did a 'live' remote broadcast with 'DJ Stubbs,' adding to the crowd of people. The EMS Division also fitted 65 bicycle helmets for kids and adults.

Enhanced Care for Specific Populations: Management of emergency medical services usually includes the development and implementation of programs that target a unique subset of EMS

patients. Providing a focal point for these programs provides more appropriate patient care and contributes to the overall efficiency of service delivery.

Supporting Public Health through EMS Resource Enhancements (SPHERE) Project: This acronym denotes an effort to use EMS data to identify and manage patients with major public health problems. SPHERE is an innovative approach to creating an interface between the larger public health arena and the realm of emergency medical services. The EMS Division will evaluate two specific pilot projects to test the conceptual design and determine if EMS personnel truly can play an active role in disease identification and prevention. The EMS Division is currently focusing on the problems of hypertension and diabetes.

- Hypertension Identification by Emergency Responders (HIER) Project: Hypertension, if left untreated, is a major risk factor for stroke and heart disease. Many people with hypertension don't know they have the disease or are under treated for the disease. EMS personnel enter the homes of thousands of residents each year in King County and routinely take a patient's blood pressure as part of the medical evaluation.

The Medical Incident Report Form (MIRF) data show that thousands of patients seen by these EMTs have high blood pressure, as defined by systolic of 160 or higher and/or diastolic of 100 or higher, at the time of their visit. Despite the 'white coat' phenomenon, these blood pressure readings are very high and cause for concern, especially in cases where patients are not transported to hospital for further examination.



The EMS Division is conducting a pilot study in partnership with the Federal Way Fire Department to determine if hypertensive patients can be identified through the MIRF database, and if so, can these patients with high blood pressure be motivated to go to a local fire station for a second blood pressure check. Results of this pilot project will help

determine if a countywide approach should be undertaken. The EMS Division plans to apply to the Medic One Foundation for initial grant funding that could serve as a conduit for a national grant application.

- Diabetes: Similar to the identification of hypertension, EMTs and paramedics in King County measure blood glucose levels thousands of times a year. Approximately 15% of the values are in the range of diabetes or under-treated diabetes. With EMS personnel present at the point of identification, there is an opportunity to encourage the patient to arrange for appropriate medical care.

A specific program designed to target diabetic patients is currently being developed and anticipate beginning a pilot project in late 2005. This pilot project will likely involve EMTs having broader indications to measure glucose and the EMS Division using the medical incident report form to screen and identify potential diabetic cases. We anticipate new cases

of diabetes will be identified in addition to patients who are under-treated for their diabetes (see Strategic Initiative Highlight on page 52).

Nursing Home/ Adult Care Facilities: The EMS Division has identified an area in which community education in nursing home/ adult care facilities would result in better, more efficient use of ALS resources. Understanding the circumstances surrounding these inappropriate calls has helped focus the education efforts.

Some of the findings include requesting ALS response after experiencing a delay in response from a private ambulance for patient transport, calling for 911 response despite having Physician's Orders for Do Not Resuscitate (DNR) on file for the patient, and calling when there is general confusion about what kind of care the patient requires. In addition, when calling 911 for assistance, facility staff did not often relay to dispatchers the appropriate and necessary patient medical information and/or did not understand the need for the dispatcher interrogation.

In response to this community need, the EMS Division developed a nursing home/ adult care facility program intervention consisting of an educational video, a job aid card, and in some cases, face-to-face training for health care providers. The objectives of the video were to provide facility staff with information on the EMS tiered response system and how it works, to assist facility staff in getting the level of EMS response that was appropriate for the patient, and prepare facility staff about what to expect during the 911 call.

The objective for the job aid card was to educate facility staff regarding what specific information they should be prepared to provide to the dispatcher when calling 911 in order for the dispatcher to best help them. EMS provider agencies are assisting the EMS Division in providing this training to facilities in an attempt to reduce unnecessary requests for ALS from nursing homes, adult care facilities, and general medical clinics.

End of Life Decisions: A single policy for managing end of life decisions among patients in cardiac arrest for whom EMS is called has been developed and implemented, clarifying the criteria under which EMTs and paramedics can withhold or terminate resuscitative efforts. This policy, approved by the King County Medical Program Director, has been incorporated into the EMT Patient Care Guidelines for all EMTs to utilize as needed.

Development of strategic initiatives that focus on efficiencies in EMS directly address the strategic directions identified in the 2002 EMS Strategic Plan Update. There are a variety of approaches to tackling this broad concept, including conducting periodic EMS fiscal reviews and analyses, evaluating EMS personnel protocols on a regular basis for opportunities to improve patient care, reducing injury and illness through community outreach programs, and developing of innovative programs to better serve sub-populations in EMS. In aggregate, these programs have been successful in reducing unnecessary calls to 911, providing more appropriate care to patients, and using resources more efficiently.

V. Strategic Planning for Next EMS Levy Period

The *2002 EMS Strategic Plan Update* to the *1998-2003 EMS Strategic Plan* outlines the operational and financial recommendations for the 2002-2007 funding period. A copy of the full report is available online at <http://www.metrokc.gov/health/ems/> or by contacting the EMS Division (see *Appendix G: EMS Division Contact Information* on page 83). The current levy period will expire December 31, 2007 and a process for discussing and developing a regional strategic plan for the next EMS levy period is already underway.

This process requires significant coordination and collaboration with all the EMS agencies, elected officials, and other stakeholders in King County, and as such is identified as a separate strategic initiative with associated funds. The discussions are expected to include all policy, programmatic, and financial aspects of the EMS system and focus on the four separate EMS levy sub-funds of ALS services, BLS services, Regional Services and Strategic Initiatives. A final document for delivery to the King County Council is expected in early to mid-2007.

C. EMS Division Programs and Activities

Introduction

In addition to the specific Strategic Initiative projects outlined in the *2002 EMS Strategic Plan Update* and *2003 Supplemental Plan*, the EMS Division plays a significant role in developing, coordinating, managing, and evaluating a variety of other EMS programs throughout King County. These programs provide a necessary regional cohesion to ensure that the standards for pre-hospital patient care are met by the 9-1-1 dispatchers receiving calls for medical assistance and by the EMTs and paramedics responding to the scene. The importance of developing and supporting innovative regional programs is often overlooked or underappreciated. The following section describes the many varied regional programs managed by the EMS Division.

I. Basic Life Support (BLS) Training and Education Program

Helping you become the best through Training and Education!



The **Basic Life Support (BLS) Training and Education Program** provides initial training, continuing education, and oversight of the recertification process for over 4,000 Emergency Medical Technicians (EMTs) in King County. This requires considerable coordination and communication between the BLS Training Section staff and the EMS agencies to ensure that training and education programs meet agency needs as well as State of Washington requirements. In addition, the training section serves as the liaison between the Washington

State Department of Health and the thirty-four fire/EMS agencies in King County. In this capacity, the EMS Division provides EMS agencies all pertinent information from the State regarding continuing education, certification, recertification, and regulatory and policy changes.

The following highlights current **BLS Training and Education Projects**:

Patient Care Guidelines: The protocols used by EMTs to direct the pre-hospital care of patients are derived from the Patient Care Guidelines (PCG). The EMS Medical Program Director (MPD) is required by Washington Administrative Code (WAC) to draft and distribute these guidelines to all EMTs in King County. The PCG were revised in 2004, in collaboration with a committee of EMS providers in King County and the MPD, and distributed in January 2005. They were also placed online so changes could be rapidly communicated to EMS personnel. The EMS system in King County is considered a national leader in EMS research and education, and as such, is committed to updating and distributing the PCG every two years to enable new and innovative techniques to be incorporated into overall EMT patient care.



Initial Training Classes for EMTs: Two initial EMT training courses are offered in the spring and fall of each year. These classes are open to personnel from all fire/EMS agencies in King County. Seattle/King County Police and King County Search and Rescue applicants are also permitted to participate in this educational opportunity. Each course consists of 120 hours of classroom and practical instruction, in addition to 10 hours of hospital observation time, using the U.S. Department of Transportation EMT-Basic curriculum as a baseline. In 2005, over 120 EMTs completed the EMT basic course.

On some occasions, the Training Program partners with fire departments to sponsor EMTs classes outside the standard course structure. For example, the Training Program recently assisted Vashon Island Fire Department in conducting an EMT class on Vashon Island as a result of increased need for EMS providers on the island. A similar model is being considered for the Seattle Police Department in early 2006. This relationship demonstrates the EMS Division's commitment to community partnership and the continued efforts toward quality regional education.

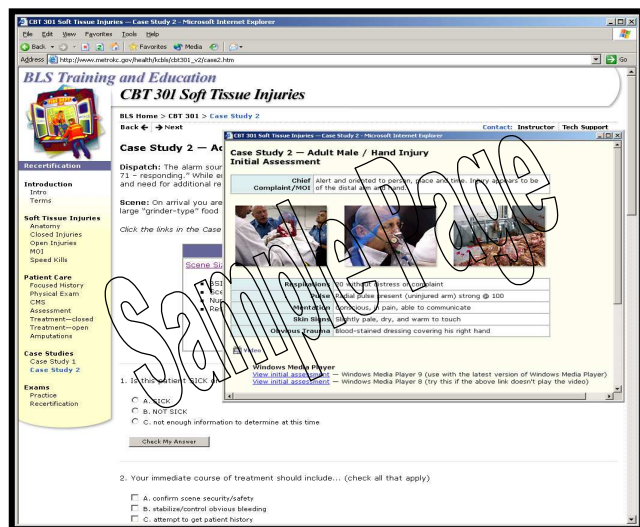
Competency Based Training (CBT): Each year, the State of Washington mandates that EMTs complete 10 hours of continuing medical education or a county-approved program of continuing medical education and evaluation. In King County, the topics are prescribed by the medical program director and include 5 annual modules on various emergency medical topics, a total of 15 modules in a three-year recertification cycle. In aggregate, this program is referred to as Competency Based Training (CBT). The BLS Training staff develops, writes, and implements the curriculum each year. The 2005 Competency Based Training curriculum is complete and includes the following selected topics: Orthopedic Injuries, Respiratory Emergencies,

Obstetric/Gynecologic Emergencies, Behavioral Emergencies, Environmental Emergencies, and Infectious Disease (infectious disease is a yearly requirement).

A **CBT Online Training Website** that delivers web-based CBT modules was developed for the first time in 2001 with the assistance of grant money from the Medic One Foundation. Eighteen modules are now available online with over 4,000 EMTs enrolled in the program (100% of the EMTs in the county). Over 32,000 courses have been completed resulting in a dramatic reduction of CBT training costs to agencies since web-based training is approximately \$18/EMT per year and standard classroom instruction is approximately \$133/EMT per year.

The online CBT curricula are designed for EMTs to study the subject in an interactive format, including realistic video case studies (produced by BLS Training staff) with complete online evaluations. The test results are automatically stored in an electronic database for centralized record keeping and reporting to county fire departments and EMS agencies. Each module has a practical skills evaluation conducted by an onsite instructor to ensure clinical skills meet King County standards. BLS Training staff provides technical support for the website and support an

instructor hotline for questions about the modules and treatment protocols. The website is currently being revised for 2005 curriculum and will add improvements to this state-of-the-art training system including improved interactivity and advanced reporting features.



The CBT EMS Online Website was originally presented to the Washington State EMS and Trauma Licensing and Recertification committee in June 2003 and was subsequently approved for use in EMT continuing education. As a result, the CBT Online Website was presented at the annual Washington State Medical Program

Directors (MPD) symposium receiving strong support for program innovation and excellence. The site consistently earned high praise from the committee as an innovative and cost-effective method of delivering EMT continuing education and a number of county MPDs expressed a great degree of interest in expanding the King County CBT Online program into other counties and throughout the state of Washington.

As a result, the on-line CBT program (EMS Online) was officially launched *statewide* on May 1, 2005 and has been well received throughout the state of Washington. To date, an additional 2,000 users outside of King County have been added, supporting this with a per head user fee with more EMTs/EMS agencies showing interest each day. The goal is to have national accreditation for all EMS Online courses and ultimately national and international exposure by the first quarter 2006. This effort is entirely consistent with the new effort by the Office of Business Relations and Economic Development to support commercial revenue generating

activities and was recently published in the journal of Pre-hospital Emergency Care (Jerin JM, Rea TD. Web-Based Training for EMT Continuing Education. Prehospital Emer Care 2005; 9: 333-337).

Early Defibrillation Program: The goal of the Early Defibrillation Program is to resuscitate the greatest number of people in cardiac arrest using a comprehensive plan that includes initial defibrillation training, continuing medical education, field documentation and reporting, equipment maintenance procedures, and quality improvement activities. The Early Defibrillation Procedures Manual was revised in 2003 to reflect new scientific understandings in resuscitation, including the standing orders for cardiac resuscitation.

In January 2005, new CPR and defibrillation guidelines were issued to EMTs and paramedics and EMS personnel will enter into a new study to collect scientific evidence regarding the relationship and quantity of CPR and use of Automated External Defibrillators (AEDs). These new guidelines specify one shock followed by two minutes of CPR. This protocol change was the direct result of an evaluation of over 500 EMT defibrillation tape recordings.

Quality improvement is a high priority within the AED Defibrillation Program. All resuscitations that occur in King County are evaluated in detail and the gathered information is used to provide timely feedback to each individual EMT and their training officers. In aggregate, the data is used for improved EMT resuscitation training and feedback to manufacturers regarding software and hardware design.

II. EMS Advisory Committee

The **EMS Advisory Committee** was formed in December 1997 and has since met on a quarterly basis to discuss the progress of the strategic plan, review the development and implementation of the strategic initiatives, and act as a judicious forum for discussion of important EMS issues. The committee played an integral role in development of the *2003 Supplemental Plan*, review of the EMS Sub-Fund financial assessments, and oversight of the strategic initiatives. This year, the EMS Advisory Committee played a critical role in supporting Emergency Medical Services in King County by assisting in the development of recommendations regarding the conversion of EMT/P units to 2-paramedic units and the implementation of the 0.5 medic unit in South King County. A copy of the current EMS Advisory Committee membership on the committee and their respective representation can be found in *Appendix E. 2005 EMS Advisory Committee Listing* on page 79.

III. Emergency Medical Dispatch (EMD)

The EMS Division provides **Basic and Continuing Education Training** in Emergency Medical Dispatch (EMD) to approximately 175 emergency 911 dispatchers in King County. This training allows the dispatcher to triage callers so that the appropriate level of care is sent to the patient. During the past year, 22 dispatchers from King County completed the 40-hour Basic EMD

Training class. In addition, 158 dispatchers were provided 8 hours of Continuing Education in EMD related topics. The EMD Instructor Course (train-the-trainer) is being redesigned to meet the standards of a problem-based delivery. This course will be piloted in late 2005.

The **2002 EMS Strategic Plan Update** identified a commitment to supporting a number of **enhancements to emergency medical dispatch**, focusing on enhanced dispatch training. Planning has begun in the following areas:

Basic Training: Additional training has been, and will continue to be, provided in the area of Basic Anatomy and Physiology to the dispatch students. This has been accomplished by adding one full day of training and testing prior to the existing 32-hour class. The 40-hour Basic Criteria Based Dispatch course includes more student application exercises and increases the students' participation in the learning process. This has been accomplished with role-play scenarios, simulation exercises, guided group discussions and other incorporated activities.

Continuing Education (CE) Training: In an effort to meet the 8 hour per year minimum requirement for continuing education, EMD training staff continue to design and develop several instructional topics for the purpose of delivery to Emergency Medical Dispatchers. The Dispatch Review Committee selects EMD CE topics based on feedback from quality improvement reviewers and data derived from evaluations of the CBD data with an emphasis on systemwide trends.



Valley Communications Center

are objectives pertaining to the findings of the quality improvement review. This gives the student/participant a very timely feedback process as it relates to trends found in the quality improvement review.

Alternate Delivery Methods for Continuing Education Training: The objective of this project was to develop and deliver the continuing education curricula in a web-based format. This method of delivery has enabled the dispatchers to log on from their own Communications Center consoles and participate in the training at their convenience when the call load volumes permit. This method of delivery has been and will continue to be used when suited to meet the desired lesson objectives.

Telephone Referral Program: The Telephone Referral Program continues to provide emergency medical dispatchers in King County with an alternative method for handling non-urgent calls to

911. Developed in 1998, EMS calls that meet specific dispatch criteria can be transferred to a nurse line for patient assistance in lieu of providing a BLS response to the scene. Common examples of these low risk, low medical need types of calls include complaints of sore throat, insomnia, sinus infection, and tooth pain.

During 2004, 857 calls were referred to the nurse line, including 521 calls from Valley Communications Center serving South King County, and 336 calls from Eastside Communications Center serving east and north King County. This is an increase of 57 calls transferred to the nurse line from the 2003 level. The Telephone Referral Program is another outstanding example of how the EMS community collaborates in the development of a cost-effective solution while improving patient care.

IV. Regional Purchasing Program

The **EMS Regional Purchasing Program** is a voluntary countywide program designed to reduce equipment and supply expenses by maximizing the joint purchasing power of EMS providers. Since its completion as a successful one-year pilot project in 1998, the program has been implemented throughout the county. The vendor for the EMS Regional Purchasing Program is selected through a competitive bid process. The primary purchase order operates through King County Medic One and EMS agencies in King County are able to coat-tail on the contract through joint purchasing agreements.

In November of 2004, the Regional Purchasing Program for Medications was implemented. Bound Tree Medical won the bid for King County Medic One, and other agencies have utilized the contract through joint purchasing agreements. Although the Medications Program is relatively new, preliminary reviews already demonstrate substantial cost savings to the county. From November 2004 through June 2005, agencies spent a total of \$41,377 on medications, with a savings of over \$20,000.

The Regional Purchasing Program is managed by an oversight committee that meets on a quarterly basis to address operational issues, review EMS products, and evaluate the status of the program. The direct administrative costs are minimal as product orders, agency invoicing, and shipping are all managed at the agency level. The Regional Purchasing Program has consistently demonstrated significant cost savings to EMS agencies since the program was developed in 1998 reflecting a commitment to both the EMS strategic plan and program efficiency.

V. Regional Medical Control

The **Medical Program Director (MPD)** is responsible under the Washington Administrative Code (WAC) and Revised Code of Washington (RCW) for medical control and direction of certified EMS personnel in King County. This is accomplished through the delegation of medical oversight to the medical directors of individual paramedic programs and emergency room-based on-line medical control for ALS personnel.

The Medical Program Director also assists in the development of policies and procedures related to the provision of ALS and BLS services, and provides written treatment guidelines for BLS personnel. The MPD works closely with the Trauma Council and is conducting an evaluation of the types of patients transported by EMS agencies to the Swedish free-standing emergency department in Issaquah (see ADAPT Program - page 43). Last year, the MPD worked with several groups to amend the state WAC for epinephrine administration in order to allow EMTs to administer epinephrine for anaphylactic patients of all ages. The prior legislation did not authorize EMTs to administer epinephrine to persons under 18 except in certain limited circumstances.

The Medical Directors' Committee, comprised of the medical directors from each ALS provider agency, provides general program oversight. The committee meets on a quarterly basis to address pertinent medical issues. Topics of interest often arise from discussions initiated as part of implementation of two Strategic Initiatives - 'Paramedic and EMT Procedure and Patient Treatment Evaluations' and 'Enhanced Care for Specific EMS Patients.' Specific areas of interest this past year have included a new quality assurance form for intubated patients, and consideration of cardiac enzyme markers to identify at-risk patients for myocardial infarction. In addition, the MPD is supervising evaluations of diabetic hypoglycemia (low blood sugar that can lead to coma), hypertension identification, narcotic overdoses, pediatric seizures, neonatal resuscitations, identification of witnessed collapse by emergency dispatchers, telephone CPR, and end of life issues.

VI. Cardiopulmonary Resuscitation (CPR) and Automated External Defibrillators (AED)

Seattle-King Community Responder AED Program: Studies have shown that cardiac arrest survival outcome increases when defibrillation occurs within the shortest time possible following collapse. The sooner a patient receives CPR and the sooner an AED is used the better the chances for the patient to recover. The Community Responder AED Program is a joint effort



between Seattle Fire Department and Public Health-Seattle & King County. This program was implemented to help public facilities, businesses, and private homes implement an appropriate training course, determine proper placement of the device(s) and register their Automated External Defibrillators (AEDs) with their local EMS, all of which are requirements to be in compliance with the Washington State Law concerning AEDs.

The Public Access Defibrillation (PAD) effort is continually growing with over 1,300 AEDs currently registered in the Community Responder AED Program. The devices are in many public places as well as private homes. Seattle Tacoma International Airport and King County Airport both have AEDs placed throughout their sites with easy access for staff and lay responders. All but one of the Seattle-King County Public Health Clinics have at least one AED

on site. Jail Health locations in Seattle and Kent have numerous AEDs on site. Many police units carry AEDs in their vehicles and all ambulances in Seattle-King County are AED equipped.

Student CPR Program: In 2004, 17,601 students (grades 6-12) were trained to perform CPR in King County. These students received nationally recognized American Heart Association training from their teachers and local firefighters. The teachers take an American Heart Association course to become BLS Instructors. The EMS Division contracted with nine school districts and six fire districts to provide CPR training in the schools this year. Many teachers and firefighters also teach an AHA First Aid course to the students. There are currently over 100 AEDs placed in King County high schools and middle schools and that number is increasing on a regular basis.

King County Employee CPR Training Program: This program is designed to teach CPR and AED skills to King County employees during their regular workday. This program trains the employees to do CPR and use an AED should the occasion arise. The annual number of employees trained last year was 2,900. There are over fifty AEDs in King County-owned facilities, including the King County Courthouse, Wells Fargo Center, and the King County jails.

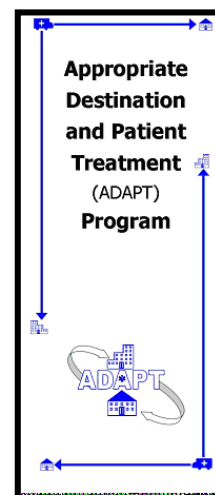
Targeted CPR Training: The EMS Division works closely with local cardiologists in King County to provide CPR and AED training to patients considered high-risk for heart related problems. This program offers in-home classes for these citizens and their family and friends. CPR is taught to all patients, and if an AED has been assigned, the family also receives AED training. Sixty five people were trained in CPR/AED last year in their homes through this program.

VII. Alternate Destination and Patient Treatment (ADAPT) Program

In an effort to guide EMTs decisions for appropriate patient transport, the EMS Division developed the Alternative Destination and Patient Treatment (ADAPT) program. Developed in 1999, the ADAPT program provides EMS patients with minor illnesses who require minimal treatment and have minimal medical risks with appropriate, convenient, and cost-efficient care by offering treatment at a local urgent care or clinic facility as an alternative to treatment at an emergency department.

In 2004, over 700 patients were transported to medical clinics across King County. In each case, this reduces the demand for care at emergency departments, decreases the out-of-service times for EMS personnel, and reduces overall costs to the medical care system.

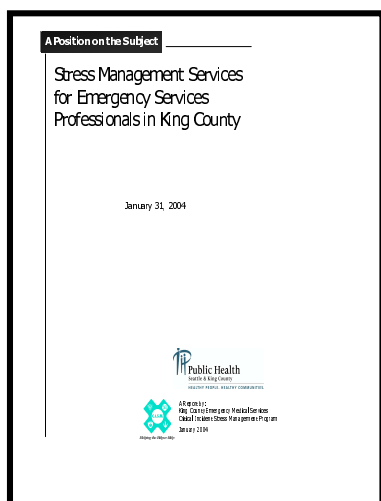
The ADAPT program and the medical conditions it identifies as eligible for alternative transport are under regular review. Currently, the program is being closely evaluated for its application to the newly opened Swedish free-standing emergency room in Issaquah. After sufficient patient outcome data is collected, the ADAPT criteria will again be reviewed and any necessary



changes to improve identification of appropriate patients will be implemented.

VIII. Critical Incident Stress Management (CISM) Program

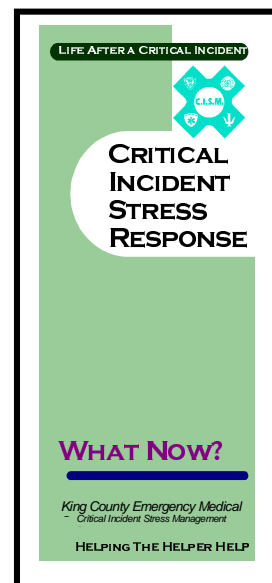
The EMS Division continues to support the mission of the CISM Program: *Helping the Helper Help*. Since 1987, the CISM program and its all-volunteer (19 member) team have provided emotional and psychological services to emergency services professionals. Although CISM has been an age-honored acronym to the critical incident stress services for the emergency services profession, it is evolving to a broader meaning: *Crisis Intervention, Stress Management*. Over the past year CISM service requests have increased along non-traditional stress impacts, i.e. terminal death and grief management.



Refocusing services offered by the CISM Program was identified as a priority in the Vision Statement included in the 2004 CISM Position Statement. In 2001, the EMS Division conducted an assessment of CISM and Critical Incident Stress Debriefing (CISD) practices due to continued criticisms of CISM/ CISD effectiveness. CISM staff and consultants reviewed over 100 articles and texts on the subject of critical incident stress management and debriefings to publish the position statement. The primary focus of that effort was to identify the philosophy, strategies and goals of the CISM and CISD services provided by the EMS Division.

The 2004 CISM Position Statement concluded that CISM services provided by peer emergency service professionals and mental health professionals to emergency service personnel and their families are based on the following public health model: **Primary Prevention** - Increasing resilience to extreme stressors; **Secondary Prevention** - Mitigating the impact of occupational exposure to extreme stressors by incorporating Psychological First Aid; and **Tertiary Prevention** - Follow-up referrals for treatment when a higher level of support care beyond psychological debriefing/crisis intervention is required.

This renewed vision brought about improved informational and instructional materials. Since the final report was published, the CISM Program in King County has been committed to its recommendations. The CISM program assists emergency services personnel, including police officers, firefighters, EMTs, paramedics, dispatchers, and corrections officers, towards improved psychological health by coordinating pre-incident stress management classes and providing oversight support to provider agencies' Peer Support Teams who serve the immediate needs of co-workers. Efforts are being focused on crisis



intervention and family support services. The full 2004 CISM Position Statement is available at <http://www.metrokc.gov/health/ems/stress-management.pdf>

There were approximately 38 post-incident CISM-related requests during the year which includes debriefings, defusings, one-on-one interventions, and referrals to mental health services. The King County CISM Team also participates with on a Washington State and an international network of CISM teams. The CISM Program Manager serves as a Washington State CISM-Network Board Member; Zone 1 (NW corner of the state) Representative; and Chair of the Ethics and Standards Committee. He is the author of the Tim Ross Humanitarian Award – an award for individual(s) who serve the greater good of the emergency services professions within the mission of the Washington State CISM-Net.

Incident specific stress services (CISD/Defusings) are educational briefing sessions.



IX. Administrative Functions

The EMS Division operates under the guidelines presented in various Master Plans, Master Plan Updates, and Strategic Plans, all approved by the King County Council. Updating the plan requires significant data analysis and program coordination. An integral component of this analysis is the data modeling used to identify optimal placement of paramedic units.

The EMS Division provides coordination of services with other divisions of Public Health-Seattle and King County. The Division also coordinates with other county agencies, councils, and offices, such as the Budget Office, Human Resources Division, Prosecuting Attorney, Risk Management, the King County Executive, and the King County Council. Responsibilities also include the coordination and delivery of strategic planning, union negotiations, personnel and payroll issues, diversity management, legal compliance, liability issues, contract administration, the issuance and compliance of policies and procedures, as well as levy planning.

The EMS Division administers contracts for five paramedic provider groups of Advanced Life Support Services (ALS), and for thirty-four Basic Life Support Provider (BLS) agencies located

in King County. The EMS Division's administrative section is responsible for maintaining fiscal responsibilities for the EMS Division, including budget preparation and monitoring, projection of long-term financial planning, and management of levy funds.

The EMS Division is also responsible for management of the Medical Incident Report Form (MIRF) data in compliance with Washington Administrative Code (WAC) 246-976-420. The EMS Division provides rapid response to data requests from EMS agencies in King County and external sources; provides data analysis and reports for pilot projects, EMS programs, and research projects; and supports network connectivity and management for EMS Division employees, medical students, and interns.

Duties related to the oversight of this dataset include management of the cardiac database and the entire MIRF data warehouse system, collection and processing of over 200,000 MIRFs per year, and regular quality review of the EMS data set and data system. A quality review effort began in 2003 which relates hospital outcomes following cardiac arrest to service and resuscitation factors. The goal continues to be to improve resuscitation rates and neurological outcomes by thoroughly reviewing both pre-hospital and hospital records on every cardiac arrest patient.

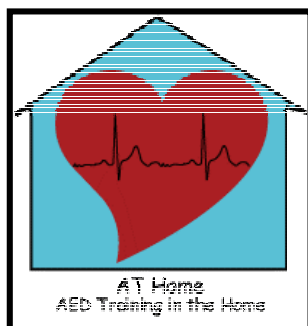
D. Grant Funded Programs and Projects

I. Center for the Evaluation of Emergency Medical Services (CEEMS)

The Center for the Evaluation of Emergency Medical Services undertakes research efforts in the field of pre-hospital emergency care. CEEMS is supported by grants and staffed by investigators from the University of Washington and employees of the EMS Division. Known both nationally and internationally in the field of cardiac arrest, the investigators are continuously sharing their cutting edge research through numerous articles published in EMS and scientific journals.

A summary of the primary CEEMS activities of the past year is as follows:

The DART Study: The Dispatcher Assisted Resuscitation Trial (DART) is an international study involving dispatch centers in King County, Thurston County, and London, England. The study will determine the best method of telephone CPR: standard CPR with chest compressions and mouth-to-mouth ventilation or chest compressions only. The study will take approximately 2 ½ years to complete and may serve to define the national standard for the delivery of telephone CPR instructions.



The At-Home Study: The AED Training in the Home study has been funded by the National Institutes of Health (NIH) and began in April 2004. The randomized controlled trial study will evaluate four types of AED training on 300 families of high-risk patients recruited from hospitals in King County following coronary syndrome admissions. The study will determine the most effective training method in terms of skills retention and psychological impact on both patient and family

member(s). Enrollment will continue through 2006.

Cardiac Arrest Outcomes: This is a privately funded grant that involves interviewing survivors of cardiac arrest and review of their hospital medical records. The goal is to evaluate the care and outcome of survivors of cardiac arrest in King County to determine whether current practice at community hospitals regarding implanted defibrillators is consistent with American Heart Association and American College of Cardiology guidelines. The study is expected to be completed in early 2006.

Paramedic Fellowship: Thanks to funding support from the Laerdal Foundation for Acute Medicine, CEEMS is offering paramedic fellowships for the purpose of conducting research. This is the first program of this nature in the country. The program offers special opportunities for paramedics under the guidance of a UW faculty mentor. The first paramedic fellow began the program in July 2005. The year-long project will be an in-depth analysis of central intravenous lines for critically ill patients. All paramedics in Seattle and King County are eligible to apply to this program. The fellowship program pays a stipend directly to the paramedic.

The Resuscitation Outcomes Consortium (ROC): The NIH recently funded the building of a consortium between ten select communities across North America to evaluate important research questions involving pre-hospital care. The agenda will consist of evaluating EMS care for life-threatening trauma and cardiac arrest. Seattle/King County has been identified as one of the select participating communities. Planning for this study is well underway. It is anticipated that the first trauma-based study will involve a randomized clinical trial of hypertonic saline, hypertonic saline plus dextran, and regular saline for blunt trauma. The first cardiac-based study will involve a randomized clinical trial of an impedance threshold device thought to improve outcomes from cardiac arrest.

II. Central Region Emergency Medical Service and Trauma Care Council

Traumatic injury is the leading cause of death for all people under the age of 44 and the leading cause of disability for all people under age 65. In 2004, Central Region (King County) hospitals treated 6,663 persons with injuries severe enough to require hospitalization, 343 of those patients died.

The Central Region EMS and Trauma Care Council was established by the Statewide Emergency Medical Services and Trauma Care System Act of 1990 (RCW 70.168). The Regional Council involves many public and private agencies in the planning and ongoing evaluation of trauma specific emergency medical services, including pre-hospital EMS agencies, King County hospitals, and local government. The main focus of the Regional Council and its subcommittees is to provide a forum for open discussion of issues faced by the EMS system and to make



recommendations for system enhancements when appropriate. A priority goal of the Regional Council is prevention of unintentional injuries and death.

Efforts in injury prevention for 2005 included grants of \$5000 each to the **Fire Stoppers** program and the Anna-Armstrong-White Foundation for **Anna's Ride Home**. The Fire Stoppers program was developed in an attempt to reduce incidents of fire play and fire setting by children and adolescents through early identification, evaluation, education, and mental health treatment. Approximately 58 hours of mental health services was provided to 15 children. The recidivism rate of children who have participated in Fire Stoppers is 2-3 percent.

Anna's ride home is a Driving Under the Influence (DUI) intervention and education program targeting patrons of taverns, bars, and restaurants. The program provides free taxi rides home for patrons who are intoxicated. The cost of the taxi ride is borne 50% by the participating establishment and 50% by Anna's Ride Home program. Using the Trauma Council grant and a \$4,812 pass-through grant from Washington Traffic Safety Council, Anna's Ride Home printed and mailed 5,000 Run/Walk Anna's Ride Home Brochures; 60 T-shirts, posters and tabletops; and handed out 360 Anna's Ride Home Vouchers in FY 05.

Anna's Ride Home is available at the following locations:

Lucky 7 - Kirkland	Rocksport Bar and Grill - West Seattle
Element - Seattle	RPlace - Seattle
Fado's - Seattle	Cowgirls Inc - Seattle
Backwater Bar and Grill - Kenmore	Horse and Cow - Silverdale
Valhalla Bar and Grill - Kirkland (opens 9/05)	Daniels Broiler - Bellevue (opens 10/05)

A second priority goal of the Regional Council is to provide appropriate emergency medical care for the population, and 2005 efforts are directed toward that goal, including:

- Award of a \$4,370 grant to the EMS Division Training Section for development of web-based trauma training for EMS pre-hospital personnel.
- Amendment of Patient Care Procedures (PCPs) to define the circumstances in which BLS patients can be transported to non-hospital based emergency rooms and clinics. The Regional Council is monitoring the effect of this revision to ensure patients are transported to appropriate care facilities.
- Participation in Washington State Hospital Association (WSHA) workgroup efforts to develop an Access to Healthcare guideline. The guideline will be based on the trauma system model of providing appropriate level of care and shared responsibility for care of the medically indigent and underinsured.
- Commitment to continue to voice concern to government officials over lack of public funding for healthcare.

Trauma Regions are grant-funded through the Washington State Department of Health. The current contract expires in December 2005.

E. Conclusion

The EMS Division is committed to providing the highest level of pre-hospital care to the citizens of King County. EMS programs are developed and maintained through strong partnerships with other EMS agencies in the region and innovative leadership in the emergency medical field in accordance with the strategic directions outlined in the *2002 EMS Strategic Plan Update*. An example of this effort is the development of a successful and popular web-based EMS training program that is proving to be both innovative and cost-efficient. The EMS Division is proud to encourage and support these types of contributions to the EMS system.

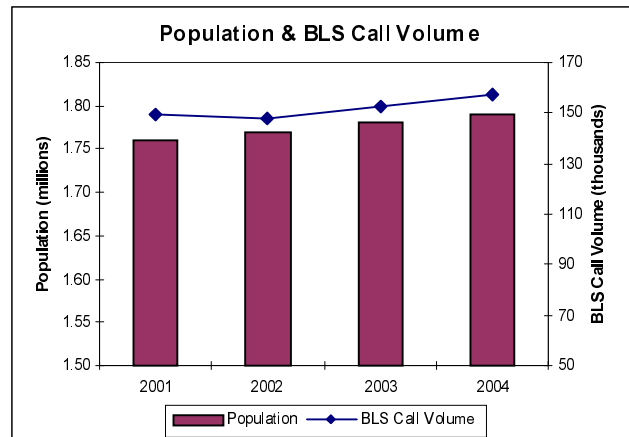
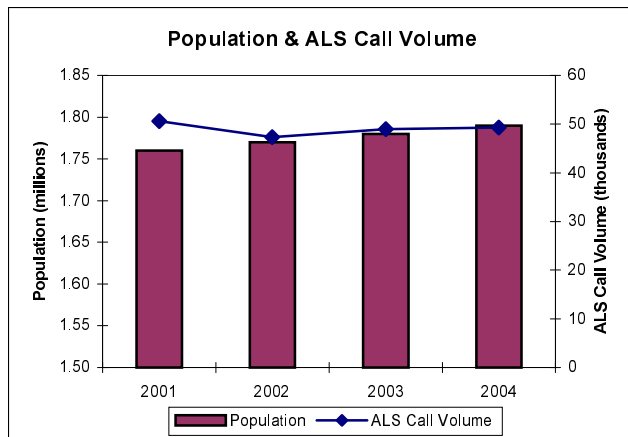
Summary of 2004 EMS Statistics (Seattle and King County)*

The following statistics are derived from the data collected on the Medical Incident Report Forms (MIRFs) and submitted by EMS agencies to the EMS Division for the year 2004.

<u>Population</u>	<u>Seattle- King County</u>	<u>% Growth</u>
1980	1,269,898	
1990	1,507,305	18.7% (10 yr)
2000	1,730,504	14.8% (10 yr)
2001	1,758,321	1.6% (1 yr)
2002	1,774,300	0.9% (1 yr)
2003	1,779,300	0.3% (1 yr)
2004	1,788,300	0.5% (1 yr)

Population has often been a factor in EMS call volume growth. Over the past two decades, population growth in King County has remained well above an average rate of 1% per year. In 2002, the yearly rate of increase started to decline to just under 1%.

The two graphs below depict the population growth relative to both BLS and ALS call volume patterns. Of interest is the continued reduction in ALS calls volume growth due in part to the success of the ALS Dispatch Criteria Revisions (see page 23). Note that the scales for population and call volumes are different.



Operations:

Number of Responses

ALS

49,279

BLS

157,008

Average Response Time

ALS

11.1 minutes / 7.4 minutes

BLS

6.0 minutes / 4.8 minutes

6 Minutes or less

70.7% / 83.3%

8 Minutes or less

43.5% / 69.6%

10 Minutes or less

60.3% / 84.2%

12 Minutes or less

71.5% / 91.9%

14 Minutes or less

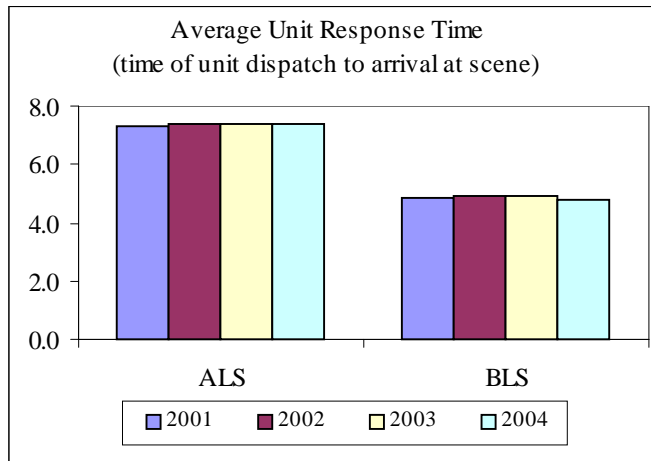
78.7% / 95.5%

Code Greens

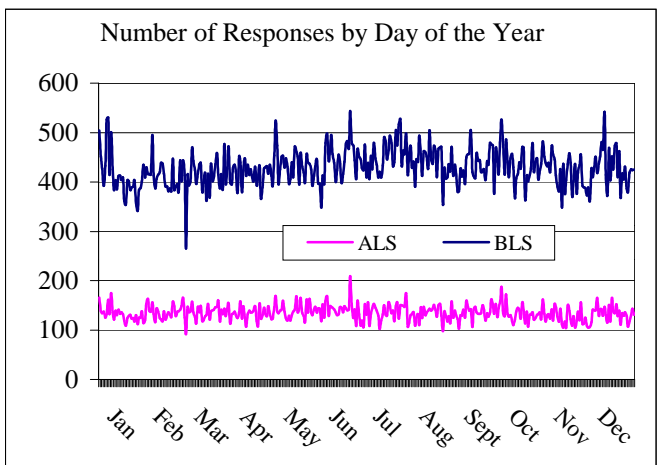
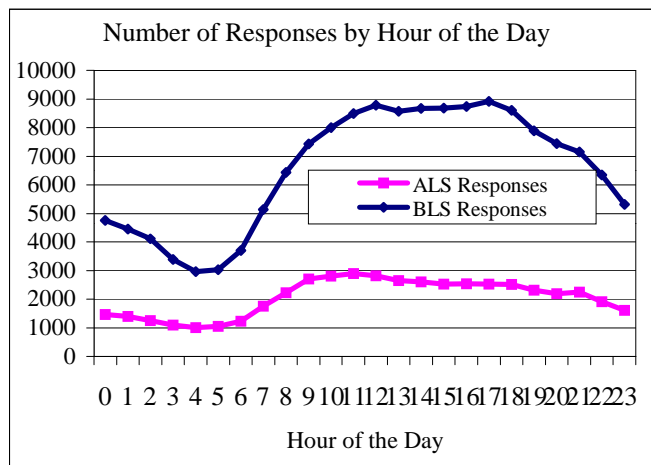
18.1%

2.3%

*The 2004 EMS data uses a fully integrated EMS Division and Seattle dataset. Response times are defined as follows: **Total** - the time of call arrival at dispatch to the time of arrival at the scene / **Unit** - the time of unit dispatch to time of arrival at the scene. Code Greens for ALS are defined as having no 'arrival at scene' time. In some instances, totals differ due to missing values.



Despite the continued growth in population and call volumes over time, the average BLS and ALS unit response times have remained stable over the past four years as reflected in the graph to the right. This may not reflect, however, local area stresses to the system and regular assessment of core medic unit indicators are conducted to ensure adequate response. The two graphs located directly below reflect the patterns of ALS and BLS response during the day and throughout the year. Of note is the daily variation in BLS responses per day over time (~270-550 calls) in comparison to ALS responses (~90-210 calls).

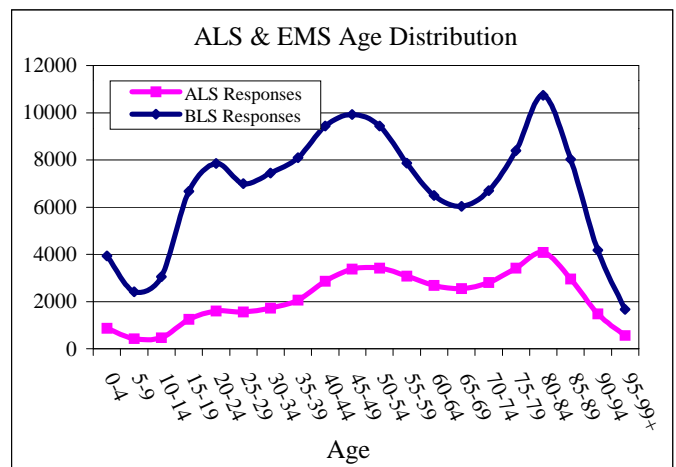


Characteristics of Responses:

The following information reflects a variety of data that characterizes the types of both BLS and ALS calls, including a comparison of age groups, types of medical complaints, where incidents take place, and patient transport information. As indicated below, paramedics providing advanced life support are more likely to attend to older patients for cardiac conditions, while EMTs often tend to trauma in young adults.

Responses by Age Group:

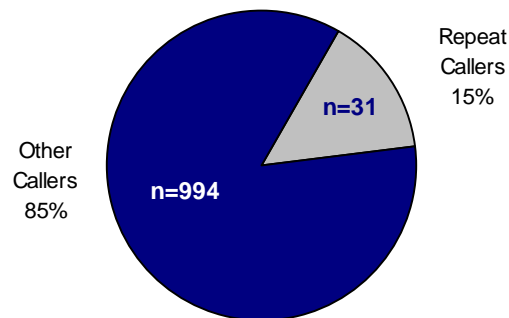
	<u>ALS</u>	<u>BLS</u>
0-17 yrs	2,035 (5.0%)	12,941 (9.6%)
18-24 yrs	1,826 (4.5%)	11,007 (8.1%)
25-44 yrs	6,948 (17.2%)	31,986 (23.6%)
45-64 yrs	11,003 (27.3%)	33,748 (24.9%)
65+ yrs	16,069 (39.8%)	45,774 (33.8%)
Total	40,335	135,456



Strategic Initiative Highlight: EMS and Repeat Callers for Diabetes

Diabetic emergencies have a significant impact on the Emergency Medical Services system in King County. In 2004, approximately 1,200 calls were made to 9-1-1 for insulin reactions, an indication of under-managed patient care. While the total volume of calls is not surprising in light of the growing nationwide diabetes epidemic, it is apparent that a few individuals account for a disproportionate number of calls. A detailed analysis of calling patterns revealed that 31 individuals relied on EMS for insulin reactions at least 4 times in 2004. The total call volume from the 31 'repeat callers' was 176. Thus, 3% of patients account for 15% of all calls for insulin reactions (see figure below).

Insulin Reaction Call Volume by Type of Caller



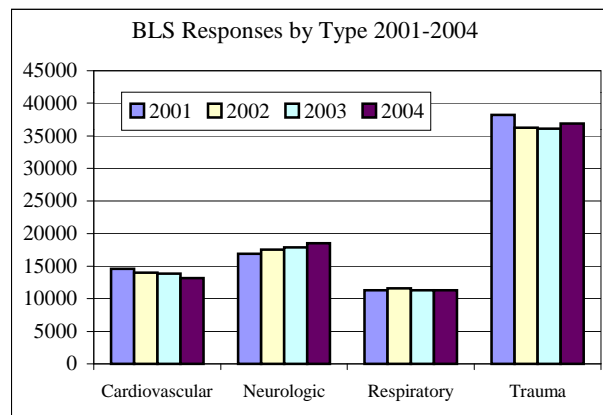
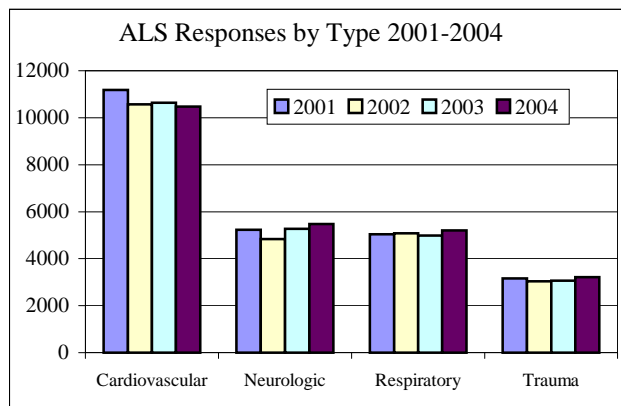
An intervention targeting repeat callers could yield substantial benefits for patients and the EMS system. As described on page 34 of the annual report, the EMS Division is evaluating the most appropriate method for addressing this situation at the local level. Options include introducing broader indications for measuring blood glucose levels to order to identify under-managed or undiagnosed diabetes in the community. This activity would ideally include the active involvement of the patient's personal physician or health care provider.

Responses by Type:

	<u>ALS</u>	<u>BLS</u>
Cardiac	10,473 (28.3%)	13,178 (10.4%)
Neurologic	5,469 (14.8%)	18,507 (14.6%)
Respiratory	5,191 (14.0%)	11,311 (8.9%)
Trauma	3,212 (8.7%)	36,916 (29.1%)
Abdominal/GU	2,050 (5.5%)	9,075 (7.2%)
Metabolic / Endocrine	1,917 (5.2%)	3,526 (2.8%)
Other Illness	8,708 (23.5%)	34,371 (27.1%)
Total	37,020	126,884

Although ALS and BLS personnel each respond more frequently to particular types of calls (i.e. cardiac calls for ALS and trauma for BLS), the EMS community serves a wide variety of medical emergencies. This

aspect requires not only an in-depth knowledge of specific invasive medical procedures but also requires a considerable breadth of knowledge and skills for diagnoses and management.



Similar to the variation reflected in the types of responses EMS agencies provide, EMS personnel also respond to a variety of physical settings, again requiring a versatility of skills. For example, providers may need to interact with other medical professionals or deliver patient care on a busy street or highway. EMS personnel also respond to public settings where they deal not only with the patient but need to cooperate and collaborate with other public safety personnel such as police officers or security guards.

Incident Locations:

	<u>ALS</u>	<u>BLS</u>
Home/Residence	20,760 (59.7%)	69,290 (53.1%)
Nursing Home	2,551 (7.3%)	6,553 (5.0%)
Clinic / MD Office	1,677 (4.8%)	2,801 (2.1%)
Street/Highway	1,718 (4.9%)	16,290 (12.5%)
Other/Unknown Location	8,094 (23.3%)	35,647 (27.3%)
Total	34,800	130,581

Cardiac Arrest Statistics:

The Cardiac Arrest Surveillance System (CASS) has evaluated cardiac arrest statistics for almost thirty years (see page 46 for more details about the Center of Evaluation of EMS). The following information depicts the cardiac arrest survival rates in King County.

CPR Initiated by Bystander:

in cardiac arrest on arrival of EMS with witnessed arrest and a rhythm of ventricular fibrillation.

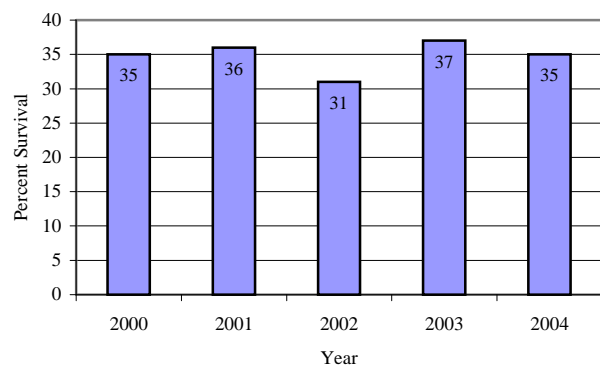
<u>Year</u>	<u>Rate</u>
2004	520/1083 (50%)
2003	500/993 (50%)

Cardiac Survival Rate: *

<u>Year</u>	<u>Rate</u>
2004	63/1810 (35%)
2000-2004	360/1015 (35%)

* Definition: discharged from hospital alive / treated patients

Percent Survival From Witnessed Ventricular Fibrillation
Cardiac Arrest, Seattle and King County



CPR Highlight: Socioeconomic Status and Survival from Out-of-Hospital Cardiac Arrest

Socioeconomic status (SES) has been linked to incidence of heart disease, but its influence on outcome from out-of-hospital cardiac arrest is not well understood. A study done in 2004 in the EMS Division hypothesized that SES would be associated with survival from cardiac arrest. Two measures of SES were used: tax-assessed property value per unit and median household income derived from census data, based on census tract of residence. Logistic regression analysis was used to evaluate the association between survival to hospital discharge and quartile of SES. Models adjusted for circumstance and EMS care factors that could confound the situation.

Among 1,789 cardiac arrests between 1999 and 2003 it was found that higher SES was associated with greater survival. Assessed property value was shown to be significant. Patients with property value of \$166,000 or less survived at a rate of 15%; those with property values of \$283,000 or greater survived at a rate of 20%. Median household income had no association with survival.

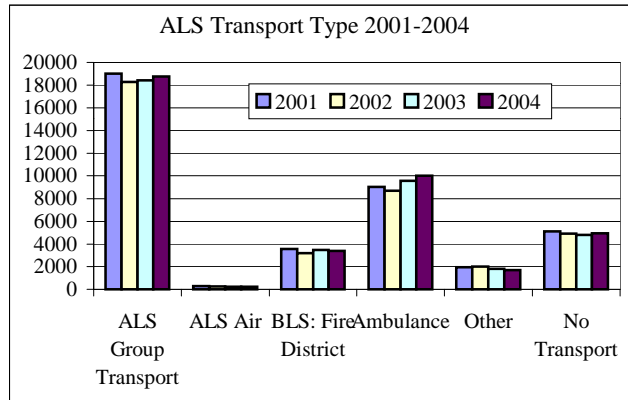
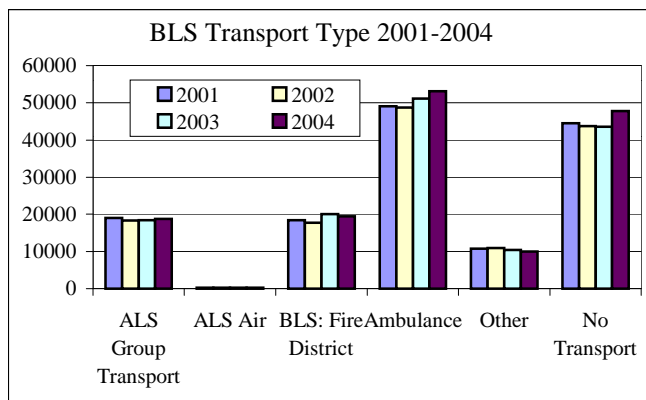
Tax Assessed Property Value	Percent Survival from Cardiac Arrest
Less than \$166,000	15%
\$166,000 - \$212,000	14%
\$213,000 - \$282,000	17%
\$283,000 or greater	20%

Identification and management of cardiovascular health disparities in community-based samples is a priority for improving public health. Understanding reasons for the disparities must underlie any attempt to change them. The better survival observed among those with greater property value does not appear to be directly related to the residential property itself, since the relationship to better survival was consistent for arrests that occurred in public as well as the home. Rather, value per unit is likely a surrogate for some other characteristic correlated with SES. This investigation did not include demographic or therapeutic characteristics which might have helped explain the relationship between value per unit and survival. Therefore, another study currently underway will use the same patient data to see how race, occupation, marital status, and previous health history might relate to survival, and what relationship they have to SES.

Authors: Samuel Clarke BA, Gina Schellenbaum MPH, Thomas Rea, MD Academic Emergency Medicine, in press.

Transport Type and Destination:

An important component of providing EMS care is appropriate triage. EMS personnel uses their skills and knowledge to match the clinical need of the patient with the most appropriate transport and destination plan. The figures below reflect the transport trends over the past four years.



Transport Type for BLS Responses:

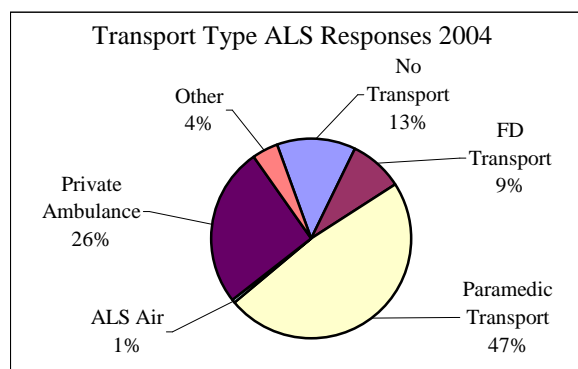
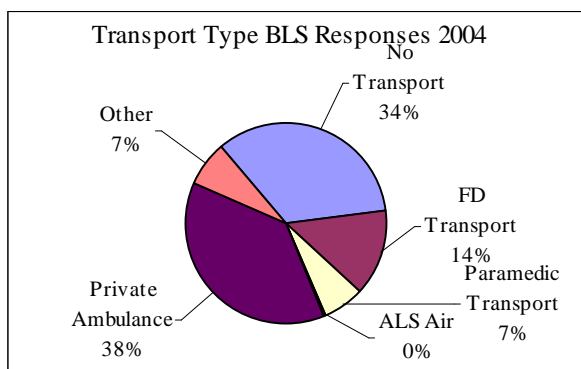
ALS Transport	18,767 (12.6%)
ALS Air	238 (0.2%)
BLS - Fire District	19,385 (13.0%)
BLS - Ambulance	53,159 (35.6%)
Other	10,013 (6.7%)
No Transport	47,777 (32.0%)

Total 149,339

Transport Type for ALS Responses:

ALS Transport	18,767 (48.0%)
ALS Air	238 (0.6%)
BLS - Fire District	3,398 (8.7%)
BLS - Ambulance	10,021 (25.7%)
Other	1,675 (4.3%)
No Transport	4,961 (12.7%)

Total 39,060



Transport Destination for BLS Responses:

Hospital	94,662 (65.2%)
Clinic	710 (0.5%)
Other	4,225 (2.9%)
No Transport	45,677 (31.4%)

Total 145,274

